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AN INSTITUTIONAL APPROACH TO THE ROLE OF COST ACCOUNTING IN REGULATED MARKETS: THE CASE OF THE ROYAL SOAP FACTORY OF SEVILLE (1515-1692) *

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Abstract

Regulated markets and state-owned monopolies characterized the economies of many Southern European and Latin American territories around the end of the Middle Ages and the Renaissance. Strikingly, however, investigation into the functioning of cost accounting in such contexts has been widely neglected in accounting research. In this paper, we examine the role of early cost systems in regulated markets by focusing on the case of the soap production and distribution monopoly in the City of Seville (Spain). In 1423, the King of Castille granted the soap monopoly to the Duke of *Alcalá* as a reward for his war achievements, but the decision on the price of soap rested in the hands of the local government. Disputes between the Duke of *Alcalá* and the local government (the parties) about the fair price of a pound of soap were resolved through tests that replicated the soap production process and determined its cost through complex calculations. Drawing on the insights of institutional sociology, we found that the test and its accompanying cost calculations constituted an institution that legitimized the parties both in the public opinion and before the King. Further, our data revealed that the parties engaged in active agency before the King of Spain to shape in their favor the constitutive elements of the institution, such as the use of purpose-purchased or stored materials in the soap test; incorporation into the total cost the rents that would have been earned if the factory buildings were leased; and the salaries of some employees (i.e., slaves, factory administrator and priest).

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An Institutional Approach to the Role of Cost Accounting in Regulated Markets:
The Case of the Royal Soap Factory of Seville (1515-1692)*

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Abstract

Regulated markets and state-owned monopolies characterized the economies of many Southern European and Latin American territories around the end of the Middle Ages and the Renaissance. Strikingly, however, investigation into the functioning of cost accounting in such contexts has been widely neglected in accounting research. In this paper, we examine the role of early cost systems in regulated markets by focusing on the case of the soap production and distribution monopoly in the City of Seville (Spain). In 1423, the King of Castille granted the soap monopoly to the Duke of *Alcalá* as a reward for his war achievements, but the decision on the price of soap rested in the hands of the local government. Disputes between the Duke of *Alcalá* and the local government (the parties) about the fair price of a pound of soap were resolved through tests that replicated the soap production process and determined its cost through complex calculations. Drawing on the insights of institutional sociology, we found that the test and its accompanying cost calculations constituted an institution that legitimized the parties both in the public opinion and before the King. Further, our data revealed that the parties engaged in active agency before the King of Spain to shape in their favor the constitutive elements of the institution, such as the use of purpose-purchased or stored materials in the soap test; incorporation into the total cost the rents that would have been earned if the factory buildings were leased; and the salaries of some employees (i.e., slaves, factory administrator and priest).

Research on 18th and 19th century organizations provided many perceptive insights into the role of early cost systems in the public sector as well as in firms operating under monopolistic conditions (Hoskin and Macve, 1986, 1988; Carmona, Ezzamel and Gutiérrez, 2002). Nevertheless, the limited time span of such investigations, and its concomitant effects on the environments that witnessed the emergence of cost accounting systems (Meyer, 1986), advised different strands of historical research in management accounting to maintain that little is known on the extent to which such systems met the demands of organizational objectives in varying circumstances (the Economics-Based School: Boyns and Edwards, 1997b; the Foucaldian School: Hoskin and Macve, 2000). In particular, valuable perceptions may be gained from investigations addressing how early cost accounting systems in many Southern European states mediated the policy of enforcing monopolies and regulated markets in such region and Latin America during the Middle Ages and the Renaissance. At the same time, extant research showed increasing interest in institutional sociology as a promising, informing framework for both management accounting (Covaleski and Dirsmith, 1988; Covaleski, Dirsmith and Samuel, 1996) and accounting history research (Carmona, Ezzamel and Gutiérrez, 1998). A study that draws on the contributions of institutional sociologists to examine the functioning of cost accounting in the regulated markets of the 16-17th centuries would highlight the intertwinement between the technical and discursive natures of such systems as well as unfold their role in public policy. Therefore, such an investigation would contribute to the overwhelming evidence that examined the functioning of early cost systems in the competitive contexts that forged many Anglo-Saxon settings in 18-19th centuries (i.e., U.K.: Boyns and Edwards, 1997a; US: Tyson, 1998; see also Edwards, Boyns and Anderson, 1995, and Fleischman and Tyson, 1998 for comprehensive reviews). By addressing the specifics of an interrelationship between accounting and the state (Miller, 1990), such a study would augment present knowledge about the role of cost systems in mature, public sector organizations (i.e., 19-20th centuries: Covaleski and Dirsmith, 1995; Carmona and Macías, 2001). In short, such a paper might avoid the bias noted by Scott (1995: 146), who stated: “it is difficult, if not

impossible, to discern the effects of institutions on social structures and behaviors if all our cases are embedded in the same or very similar contexts."

Archival evidence supporting this investigation is gathered from the Royal Soap Factory of Seville (*Reales Almonas de Sevilla*, RAS)[1], a firm that from 1423-1811[2] enjoyed the royal privilege of being the sole producer and purveyor of soap to the City of Seville, Spain. Interestingly, however, the royal decree that granted the monopoly also established that the local government of Seville should set the soap price. In such circumstances, the RAS and the local government (the parties, hereafter) became enmeshed in disputes about the fair price of soap. These disputes were resolved through *ad-hoc* tests that replicated the production process of soap and aimed at tracking its manufacturing and administrative costs through complex calculations. Our investigation draws on primary evidence about the tests that occurred in the 16th and 17th centuries as well as on the extensive correspondence that was forwarded by the RAS, the local government of Seville, and the Royal House.

This article may be of interest for several reasons. First, we approach the environmental circumstances that witnessed the functioning of cost accounting in a setting (i.e., early regulated markets in Southern Europe) and a time period (i.e., 16-17th centuries) that has been widely neglected by accounting historians. By doing this, we expect to enhance understanding about the technical and discursive natures of cost calculations as well as the role of cost accounting systems in enforcing public policy at the outset of regulated markets. In particular, we aim at elucidating the role of cost accounting in the long-term survival of a monopoly that was originally granted to express the royal gratitude for war achievements rather than to signal recognition for efficient

[1] Archival evidence comes from the *Archivo Ducal de Medinaceli, Seccción de Alcalá (*Archive of the Dukedom of Medinaceli, Alcalá Section, ADMSA) and the *Archivo Municipal de Sevilla* (The Municipal Archive of Seville, AMS). Both archives are well preserved and provide free access to researchers. Interestingly, the archives are specialized and keep records that report the perspective of either the RAS (i.e., ADMSA) or the local government of Seville (i.e., AMS). This enabled us to crosscheck the consistency and reliability of our data sources. The archives do not contain information on the overall "financial" accounting system of the RAS and, thus, it is not possible to determine the firm's profits during our observation period.

[2] The soap monopoly lasted until August 6th, 1811, when the Spanish Parliament abolished private monopolies by law.

management. Second, institutional sociology is regarded as a constitutive element of mainstream research in organization theory (Scott, 1987; Hall, 1991: 289). Though growing, accounting history research that draws on the insights of institutional sociology is still sparse (Covaleski and Dirsmith, 1995; Carmona, Ezzamel and Gutiérrez, 1998; Carmona and Macías, 2001). By relying on the contributions of institutional sociologists, we expect to render visible the role of cost accounting in the interface of business organizations and the state, an area that is regarded as particularly "promising" by institutional sociologists (Meyer, 1986: 355). Third, notably lacking from institutional sociology is explicit attention to the role of human and organizational agency in the set up and development of institutions (DiMaggio, 1988; Suchman, 1995). As noted by Carruthers (1995: 324), organizations frequently play an active role in constructing rationalized myths or shaping how they are applied in particular instances. Therefore, by focusing on the efforts of the parties to shape institutions, we also expect to develop an interdisciplinary investigation that casts light on research issues of both management accounting history and institutional sociology.

THE FRAMEWORK OF INSTITUTIONAL SOCIOLOGY

A central tenet of institutional sociology is that organizational contexts are "characterized by the elaboration of rules and requirements to which individual organizations must conform if they are to receive support and legitimacy" (Scott and Meyer, 1983: 149). Such rules and requirements are known as institutions, which in turn are defined as "cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior" (Scott, 1995: 33). Organizational conformity to institutional pressures avoid external claims of irrationality and negligible behavior and organizations which do this garner legitimacy and resources and enhance their life prospects. As noted by institutional sociologists, "being technically efficient is not the only path to organizational survival. Achieving legitimacy in the eyes of the world, state, powerful professions, or society at large, is another effective survival strategy" (Carruthers, 1995: 317). Legitimacy is defined as "the generalized

perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995: 574). Deephouse (1996: 1025) identifies two types of legitimacy: regulatory endorsement, the acceptance of an organization by the state agencies that formally regulate it; public endorsement, the acceptance of an organization by the general public.

Firms deploy active agency in their pursuit of legitimacy (Meyer and Rowan, 1977; Scott, 1987). As noted by DiMaggio (1988: 15), "recruiting or creating an environment that can enact their claims is the central task that institutionalized entrepreneurs face in carrying out a successful institutionalization project", and this occurs as an outcome of the considerable latitude that managers have to manipulate the external environment of firms (Oliver, 1991). Organizational deployment of legitimacy-building strategies involves "(a) efforts to *conform* to the dictates of preexisting audiences within the organization's current environment, (b) efforts to *select* among multiple environments in pursuit of an audience that will support current practices, and (c) efforts to *manipulate* environmental structure by creating new audiences and new legitimating beliefs" (Suchman, 1995: 587, emphasis in original). A common characteristic of these strategies is that institutional entrepreneurs strive to make a case of the technical nature of rules and norms (Scott and Meyer, 1991: 124), and accordingly, the incorporation of such technical elements into institutions is an attempt to maintain an appearance of rationality (Carruthers, 1995: 315).

The development and use of highly technical, even mystical, analytical tools are seen to engender legitimacy (Dirsmith, 1986: 358; also Meyer, 1986), and this is the case of cost accounting systems. Such systems, it is argued, are infused with the appearance of a technical function that is developed by professionals. Therefore, the accounting craft displays considerable potentials for motivation and control that make it a legitimating institution, to the extent that it mediates the mapping between action and values (Richardson, 1987: 341 and 343). In short, as Richardson (1987: 349) notes, accounting fulfills two roles:

"It is a means by which organizations may signal their rationality and meet the expectations of society, and it is implicated by which of these values come to be clarified and codified as social expectations." Rationality signaling, however, may be motivated by firms' attempts to convey an imagery of efficiency to external constituents instead of an actual deployment of accounting systems (Abernethy and Chua, 1996). Meyer and Rowan (1977) designate as decoupling the contrast between actual and apparent behavior.

THE SETTING

In the Medieval Ages, the City of Seville enjoyed a long tradition as high-quality soap producer (González Moreno, 1975). Such a reputation was attributed to both the sophisticated soap production technologies introduced by the Arabs during their occupation of the City from the 8-13th centuries[3] and the quality of the raw materials, especially olive oil and ashes produced in the *Guadalquivir* Valley.

It was customary on the part of the Kings of Castille to grant territories and / or monopolies over economic activities to members of the knighthood and the Catholic Church who excelled in their services to the Crown, such as those who helped the Kingdom to reclaim Andalusia from the Arabs during the Middle Ages. In this tradition, King *Enrique* II issued a royal decree on May 23rd, 1396, to grant the monopoly of soap production and distribution in the City of Seville to Archbishop *Ruy López-Dávalos* (ADMSA. *Legajo* 55-16). Such royal privilege was then extended or transferred to other individuals until 1423. At that time, King *Juan* II expanded the privilege from the City of Seville to its entire area of influence and granted it to Admiral *Alonso Enríquez*, who simultaneously received the Dukedom of *Alcalá* (ADMSA. *Legajos* 55-17 and 57-7). In this manner, the King expressed gratitude to the Duke for his war achievements. Importantly, the monopoly on soap production and distribution also encompassed some of its raw materials (i.e., ashes), as stated by King *Enrique* IV in a royal decree enacted in 1456 (ADMSA. *Legajo* 56-2):

[3] The influence of the Arabs on the soap business is illustrated by the adoption in ancient Spanish of the Arabic word that designated a soap factory, *Almona.*

> " … No one but the recipients of my royal privilege shall ever dare to produce ashes to make soap, with the exception of their employees, those having signed with them a lease contract as well as those having obtained their consent …"

Further, the Dukedom of Alcalá deployed an active policy of acquisition of olive trees and ashes farms during the 15-17th centuries that aimed at ensuring the supply of raw materials to the RAS and deter smuggling (González Moreno, 1975). Concerning the latter, our searches in the archives showed that the Dukedom of Alcalá filed lawsuits against soap smugglers extensively, regardless of the marginal significance of the illegal trade (ADMSA. *Legajos* 50-26, 50-47, 51-28; AMS. Section *1, Litigios*, Folder 107, Number 3).

The RAS were located in an impressive building surrounded by warehouses. The soap production and distribution processes were run by some 50 employees and were characterized by its tough working conditions. The heat of soap production added to the usual high humidity and temperatures of Seville during five months a year (86-104ºF, 30-40ºC), and this posed considerable difficulties over working conditions: "… only inside the reduced space of the office of weights and measures it is possible to breathe" (ADMSA. *Legajo* 50-19). Interestingly, the shop floor was run by six operators, who used to be Sevillian slaves, redeeming their misbehaviors by working stays at the RAS (Franco Silva, 1978; Cires Ordóñez, García Ballesteros and Vilchez Vitienes, 1989).

The royal decree that granted the soap production and distribution privilege to the Dukedom of Alcalá (ADMSA. *Legajos* 55-17 and 57-7) stated that the local government should set the soap price. Price changes in any of the soap components (i.e., olive oil, ashes) brought about frequent quarrels between interested parties about the fair price of soap. As we shall see, such conflicts also involved the Royal House and ended with the development of an *ensaye* –a test that replicated the soap production process and aimed at tracking its corresponding costs.

The governing conditions of the tests were quite strict. A team of soap experts, whose names were negotiated by the parties, conducted the tests. These experts were selected from outside Seville to guarantee their independence and neutrality. Further, the parties agreed to keep their contact with the experts up to a minimum to avoid interferences (i.e., the experts were not allowed to sleep in Seville during the tests). Importantly, a local judge supervised the tests, while an accounting expert of the Catholic Church kept cost calculations and wrote a final report (ADMSA. *Legajos* 53-19). Tests were normally conducted on Saturdays, and the soap produced was stored in a sealed room until it was frozen. Once this occurred, usually on the following Monday, the final product was weighed and the cost of a pound of soap was determined.

Admittedly, the date of the earliest test remains unclear. However, our analysis of the extant archival evidence suggests that it took place sometime during the period 1515-1520. Until 1515, the available evidence indicates that the soap price was set by the local government, though the Royal House used to interfere in such decision at the request of the Duke of *Alcalá*. A document in the archives indicates that the Council of Seville, in a meeting held on August 23rd, 1483, allowed the RAS to raise the price of a pound of soap from 6 to 7 *maravedíes*, as a consequence of reported cost increases in its basic components (ADMSA. *Legajo* 50-5). In 1492, the local government decreased the soap price from 7 to 5 *maravedíes* because of a drop in the price of olive oil, though a royal decree revoked such decision and set the soap price back to 7 *maravedíes* (ADMSA. *Legajo* 50-13). On August 13th, 1515 the royal house forwarded a decree to the local government to set the soap price at 6 *maravedíes*. To sum up, there are no traces of tests before 1515, and available evidence reveals that the local government unilaterally set the soap price, though the Royal House interfered in these decisions. As we shall see, the documents that report the 1525 test make some vague references to previous, undated tests. In particular, González Moreno (1975: 92) indicates that a test was held in

1520, though he does not provide any further details on its characteristics. Taking this evidence together, we suggest that the first test was held sometime in the period of 1515-1520.

THE 1525 TEST

The local government took the initiative for the development of the January 1525 test, on the basis of a perceived high price of soap (ADMSA. *Legajo* 51-4; AMS. Section 1, *Litigios*, Folder 116, Number 57). Importantly, materials used in the test were purpose-purchased, and not taken from the RAS' inventories, as claimed the Duke of *Alcalá*. Table 1 shows materials consumption.

---------- Table 1 to appear about here ----------

The documents in the archives depict the specifics of raw material costs. The olive oil was purchased at the *Postigo del Aceite* (Olive Oil Gate) of Seville. Reported price was the outcome of a weighted average of all olive oil acquisitions made during the preceding week: "those prices were used and distributed and each *arroba* cost 140.5 *maravedíes*, once the five *maravedíes* of *alcabala*[4] were taken into consideration" (ADMSA. *Legajo* 53-27; see Appendix). The purchasing cost of a *fanega* of ashes was 40 *maravedíes* and 10 more *maravedíes* were added to account for transportation and sundry costs. A *carga* (load) of wood cost 2 *Reales*, that is, 68 *maravedíes* (see Appendix). However, one tenth of the *carga* was not used in the test, and this produced a decrease of 7 *maravedíes* in the final cost (see Appendix). Lastly, the soap experts who ran the test estimated the cost of lye.

The soap produced weighed 7 *arrobas* and 11 pounds, that is, 186 pounds of soap. This implied that one *arroba* of olive oil produced 62 pounds of soap and such outcome was regarded as a "high performance of olive oil" ("*alto rendimiento del aceite*"). Further, it was admitted "this test has been more successful than any of the preceding ones" (ADMSA. *Legajo* 51-4), as one *arroba* of olive oil normally made 50-51 pounds of soap. Although materials used in

[4] *Alcabala*, a tax sale.

the production of a pound of soap cost 4.818 *maravedíes*, difficulties of handling decimals at the time made the experts consider the cost "4 ½ *maravedíes* and one *nueva*", that is 4.75 *maravedíes*, per pound of soap.

The manager of the RAS, however, complained that soap production also involved other activities, and thus, their accompanying costs had to be added to those calculated for raw materials. These complaints are gathered in the memorandum that is summarized in Table 2. Column 1 depicts the RAS management's claims about items and prices that had to be incorporated into the production cost of soap, whereas column 2 reports the reaction, and final decision, of local government's representatives.

---------- Table 2 to appear about here ----------

What follows is a description of the rationale employed by the RAS management as well as some of the counterarguments posed by the local government:

(i) If leased, the house that hosted the soap factory would have produced an annual rent of 16,000 *maravedíes*;

(ii) The wages of the six shop-floor operators should be considered. Representatives of the local government verified, however, that five out of the six shop-floor employees were slaves. Therefore, they agreed in budgeting their living costs, but removed their suggested wages (i.e., 17,000 *maravedíes* / year);

(iii) Investments made by the RAS in inventory and machinery would have fairly produced a 10% annual return, and this made 300,000 *maravedíes* in the opinion of the RAS management. As shown in Table 2, this figure was marginally accepted by the local government, which incorporated 20,000 *maravedíes* into the soap cost.

Accepted claims amounted to 171,175 *maravedíes*, which were allocated to the expected annual production of soap, that is, 417,000 pounds. Non-production costs, in short, increased the cost per pound by 0.41 *maravedíes*. However, the abovementioned problems regarding the handling of decimals brought about the following consideration: "… it seems that each pound costs

one *nueva* which is one fourth of *maravedí* as well as half a *nueva*, which is one eight of *maravedí* …" The resulting figure was rounded down and made 0.25 + 0.125 = 0.375 instead of 0.41, which in absolute terms, meant a difference of 14,900 *maravedíes (*171,275 – 156,275). The final report of the test stated: "… the remaining 14,900 *maravedíes* are for the people [of Seville] because there is no way to allocate this amount to the pounds [of soap], and ultimately, this amount is consumed and are consumed [sic] by the people of Seville …"

The experts who carried out the test, however, admitted that this test witnessed an outstanding performance of olive oil. Under normal conditions, one *arroba* of olive oil would have produced 50 or 51 pounds of soap, and if that had occurred in this test, the cost of a pound of soap would be 6 *maravedíes*, instead of the 4.75 *maravedíes* calculated from the test of January 1525. Consequently, they proposed to set the soap price at 6 *maravedíes* and pointed out that "the test was beneficial for the people of Seville and worth being taken as a reference for the future."

THE ANTECEDENTS OF THE 1615 TESTS

In 1602, the soap price was set at 18 *maravedíes*/ pound[5]. The Duke of *Alcalá*, however, disagreed with this price and its supporting test and forwarded a memorandum of complaints to the King (ADMSA. *Legajo* 53-17). The Duke argued that the local government did not consider some of the costs that are instrumental to the processes of soap production and distribution (i.e., wages of the salespersons) and that he dismissed the costs of materials' wastage and theft from the production costs. As a matter of principle, the Duke indicated that tests should be carried out with materials taken from the RAS, and not with those purpose-purchased. The former, he stated, had a lower quality than the latter to the extent "stored materials are less and less strong as time goes by … [and] one *arroba* of olive oil cannot produce 48 to 50 pounds of

[5] The City of Seville was granted the privilege of trade monopoly with Latin-America. As a consequence of the massive shipments of gold and silver to the City from the Spanish overseas colonies, inflation soared in Seville during the 16th –17th centuries. This period is known in economic history as the "high inflation of Seville" (*la gran inflación de Sevilla*, see Hamilton, 1975; Morales Padrón, 1977), and this may explain why the price of a pound of soap tripled in 77 years.

soap because of the bad quality of many [raw] materials, like lye." The Duke also reported that a pound of soap was being sold in the range of 20-32 *maravedíes* in nearby cities, and this made him face considerable financial losses. The arguments of the Duke appealed to the King, who ordered the development of a test that was carried out in 1603. On the basis of this test, the soap price was set at 22 *maravedíes*. Interestingly, the parties agreed that such price "shall not change in the future, and thus, no consideration will be made of increases or decreases in costs of raw materials." King *Felipe* III endorsed the agreement on September 3rd, 1603 (ADMSA. *Legajo* 53-19).

In 1614, however, changes in the cost of raw materials brought about a test that showed a cost of 30 *maravedíes* per pound of soap. The Judge of the Court of Seville, Mr. Juan del Castillo, stated that raw materials performed poorly in this test and endorsed the decision of the local government to set the price at 24 *maravedíes* / pound. This made the Duke of *Alcalá* forward a memorandum of complaints to the Royal Council. He claimed that a considerable number of items had not been taken into consideration: the salaries of supervisors and foremen and the "interest of investments in materials, machinery and real estate". He asked the Royal Council to enforce the development of a new test, and meanwhile, set the soap price at 33 *maravedíes* / pound.

The Royal Council reacted on July 28th, 1614. It ordered the development of a new test and enforced a temporary soap price of 24 *maravedíes* / pound. Although the Duke recognized the willingness of the local government to carry out the test, he disagreed with its intention to use "highly selected and strong materials." In contrast, the Duke claimed that the RAS made purchases "on a yearly basis", and therefore, "stored materials could not be as good or as strong as those purpose-purchased."

The local government, in turn, claimed that the present price of soap was very convenient for the Duke. It was argued that the Duke's correspondence with the Royal Council contained unbearable claims to cover up his ultimate

goal of delaying the development of a new test. Furthermore, the local government made a point for not using the RAS' inventories in future tests:

> " … many [of the inventories] were dried and corrupted because they were purchased for [the Duke's] convenience. If the test were carried out with such materials, the soap price would be set at least at forty *maravedíes* per pound. The present procedure was backed by tradition and did not cause any damage to the Duke; thus, none of his claims were justified because the City was careful to ascertain prices of lye, olive oil and other materials from verifiable sources. These prices were then incorporated into the cost of soap in the same manner as it has been done in the long past …"

The local government supported its contention by attaching the result of a recent, undated test that determined a unit cost of 15.83 *maravedíes* / pound. The soap price, however, was set at 18 *maravedíes* / pound "to deter further delays and lawsuits [from the Duke]".

The Duke, however, disagreed with the procedures that governed this test and thus forwarded a new memorandum of complaints to the Royal Council. He claimed that the production and distribution processes for the soap involved more than fifty people and that the local government just considered the salaries of as many as twenty employees. The Duke also argued, "the RAS were housed in a huge building whose maintenance required annual expenditures of at least 500 *ducados* and whose yearly rent, if leased, would have produced 1,000 *ducados*… [Lastly, I have made] considerable investments in inventory and machinery." Such considerations, the Duke added in his letter, were dismissed by the local government, which only admitted one fourth of the maintenance costs. In short, the Duke asked the Royal Council to enforce the incorporation of these costs into the soap price. He also claimed that tests should

> "use inventories from the RAS [in the development of the test] and not pick up a number of singular and exclusive materials that are easy to use for a test but are not in the normal running of the RAS. [The latter] required the supply of huge inventories to avoid materials shortages and equally

implied that ashes and lime lessened their strength and died (sic) so that they produced half the amount of soap that was obtained with purpose-purchased materials."

These arguments appealed to the Royal Council. On April 9th, 1615, it forwarded an order to the local government to set the soap price at 22 *maravedíes* / pound as well as to conduct two tests. One test to be run with RAS inventories; the other test to be carried out with purpose-purchased materials. These tests "should be conducted in the next forty days by [four] persons experienced in the art of soap production, two [people] appointed by each side. The results of the tests should be reported to the Royal Council, which shall make a fair decision."

This order worried the Duke of *Alcalá*, who reiterated his point of the huge purchases made by the RAS to guarantee the regular supply of soap to the City of Seville; and thus, "there was no justification to carry out a test with purpose-purchased materials." He also claimed that the soap price should be provisionally set at 30 *maravedíes* / pound, instead of 22 *maravedíes*.

The local government also disagreed with the order of the Royal Council of April 9th 1615 (AMS. Section 4,Volume 1, Number 11), and insisted in its contention that a recent test determined a soap cost of 15.83 *maravedíes* / pound. Therefore, the local government asked for the authorization of the Royal Council to execute this price in view of the "maneuvers of the Duke to delay the test and thus make profits from a convenient, current price of 24 *maravedíes* / pound." Further, it was stated that the "Duke could manipulate the test by letting the RAS materials become corrupt and thus cause an insurmountable damage to the City and its inhabitants." The local government emphasized that all costs of raw materials and personnel had been taken into consideration and that the Duke attempted to include in the soap production costs "the wages of some slaves who were redeeming their attempts to escape from their owners and to whom the Duke just provided with food and lodging."

On July 3rd, 1615, the Royal Council issued an order that maintained the conditions stated on the document dated April 9th and appointed Mr. Juan del Castillo, a judge of the Court of Seville, as supervisor of the two tests. Such conditions were slightly modified by an order of September 12th, 1615, which also appointed Mr. Pedro Maldonado, a fellow judge of the Court of Seville, as a co-supervisor of the tests. The judges, in turn, appointed Mr. Juan Bautista de Herrera, *Contador* (Accountant) of the Sacred Church of Seville to keep records of the tests and prepare a final report (ADMSA. *Legajo* 53-28; AMS. Section 1, *Litigios*, Folder 116, Number 57).

THE 1615 TESTS

> The Accountant reported first how materials costs were calculated: "… purchased materials are priced as shown in the attached certifications. Materials taken from the RAS are valued at their apparent purchase prices according to the certifications delivered by management …"

Prices of materials consumed for both tests are summarized in Table 3.

---------- Table 3 to appear about here ----------

For the test undertaken with purpose-purchased materials, we summarize the clarifications made by the Accountant. First, it was necessary to buy 12 *fanegas* of ashes, whose unit cost was 5 *Reales* / fanega, making a total cost of 2,040 *maravedíes*. Transportation costs were 24 *Reales*, that is 816 *maravedíes*, and the resulting amount was charged with 10% tax rate. The total cost of ashes, therefore, was 3,060 *maravedíes* and the unit cost was 255 *maravedíes* / fanega. Second, the experts acquired 12 *fanegas* of lime, whose total cost was 510 *maravedíes*. The final cost of lime was increased by both 51 *maravedíes* of taxes and the rent of a horse (153 *maravedíes)*. This made the total cost of lime 1,598 *maravedíes*. Third, 8 *quintales* of wood were purchased for both tests, at a cost of 612 *maravedíes*. Further, transportation costs of wood were 102 *maravedíes*. This made a total cost of 714 *maravedíes* and a unit cost of 89 3 / 12 *maravedíes* / *quintal*. Consumption of wood for this test was written on the left margin of the paper, and the following data were provided:

[Wood] delivered for the test	12 *arrobas* and 10 pounds
[Wood] returned from the test	5 *arrobas* and 2 pounds
[Wood] consumed in the test	7 *arrobas* and 8 pounds

Fifth, 2 *fanegas* of olive greaves, with a unit price of 102 *maravedíes* / fanega, were purchased for both tests, and transportation costs amounted 68 *maravedíes.* Overall, this brought the total cost of oil greaves to 272 *maravedíes.* Again, the Accountant kept records of the consumption of oil greaves for this test:

[Olive greaves] delivered for the test	12 *almudes*
[Olive greaves] returned from the test	6 *almudes*
[Olive greaves] consumed in the test	6 *almudes*

Sixth, the unit cost of olive oil was determined by calculating the weighted average of all purchases made during the period October 10th- November 10th, as shown in certifications requested from the supervisor of the Olive Oil Gate. Twelve different prices were provided, and this resulted in a total cost of 3,979.5 *maravedíes* that, after adding the corresponding taxes, made a unit cost of 375 1 / 12 *maravedíes* / arroba.

In a similar vein, the test that used materials taken from the RAS required a number of clarifications by the Accountant, which we summarize as follows. First, the cost of ashes was determined upon the certification provided by the accountant of the RAS. Purchasing cost was 5 *Reales* / fanega plus a 10% tax rate for the *alcabala,* which made a unit cost of 187 *maravedíes.* Second, information about the cost of lime was gathered from the accounting books of the RAS, which revealed the purchase of 18 *carretadas* that cost 25 ½ *ducados.* Upon the addition of taxes, the total cost became 28 *ducados* (10,500 *maravedíes),* which in turn made the unit cost of lime 72 11 / 12 *maravedíes* / *fanega.* Third, wood had the same price for both tests, as noted above. Wood consumption for this test was recorded as follows:

[Wood] delivered for the test	8 *arrobas* and 17 pounds
[Wood] returned from the test	5 *arrobas* and 15 pounds
[Wood] consumed in the test	3 *arrobas* and 2 pounds

Fourth, oil greaves were also purchased for both tests and the consumption was recorded as follows:

[Olive greaves] delivered for the test	12 *almudes*
[Olive greaves] returned from the test	10 *almudes* and 2 fourths
[Olive greaves] consumed in the test	1 *almud* and 2 fourths

Fifth, certifications issued by the supervisor of the Olive Oil Gate were used to determine the cost of olive oil. These certifications covered the period of September 10th - October 10th, 1615. Calculation of the weighted average price of olive oil made a unit cost of 335 3/12 *maravedíes*, which in turn resulted in a total cost of 385.25 *maravedíes*/*arroba*, after the inclusion of the corresponding taxes.

Drawing on these data, the cost of a pound of olive oil was calculated by both excluding and including the transportation costs in the purpose-purchased test. The first case resulted in a unit cost of 24.4166 *maravedíes*, whereas the latter produced a unit cost of 32.66 *maravedíes* per pound of olive oil. On the other hand, the test that used the RAS materials produced a unit cost of 27.66 *maravedíes*/pound. Interestingly, the latter calculation did not encompass any of the administration and management costs that constituted a permanent matter of concern on the part of the RAS. The parties, however, agreed that such costs amounted 10 million *maravedíes*/year, which in turn made a soap cost of 37.66 *maravedíes*. In short, the test run with materials taken from the RAS produced a soap cost that was 5 *maravedíes* more expensive than its purpose-purchased materials counterpart. Our searches in the archives, regrettably, did not provide any insight into the soap price that was set after the 1615 tests.

THE 1640-1692 PERIOD

In 1640, Mr. Antonio de la Cerda, Duke of *Medinaceli*[6], married the heiress of the Dukedom of *Alcalá* and took over the royal privilege to make and distribute soap to the City of Seville and its area of influence. On January 18th, 1643, the parties agreed to soap prices of 30 *maravedíes* during the next four

[6] The Dukedom of Medinaceli constituted(s) one of the greatest exemplars of the Spanish knighthood.

years and 32 *maravedíes* during the four following ones. King Felipe IV endorsed such agreement on November 2nd, 1643 (ADMSA. *Legajo* 53-38; AMS. Section 4, Volume 4, Number 15), and was subject to several conditions. First, such prices were not contingent upon the olive oil price. Second, the soap market was regulated by a royal privilege, and thus, the soap price would be revised if changes occurred in the terms of the privilege. Third, quality conditions for soap (i.e., color, tightness) and olive oil performance (i.e., 52 pounds per *arroba* of olive oil) were established. Fourth, soap supply would be provided to 14 shops. The location of the shops was also negotiated, and it included the different neighborhoods of Seville and its area of influence. Further, the shops had to be open seven days a week, 24 hours / day. Fifth, trade at the shops should be restricted to bread, olive oil and coal. Weighting devices should be cleaned and sealed, and the seal had to be checked by a City supervisor every four months. Lastly, the soap price should be on permanent display.

In spite of this agreement, conflicts between the local government and the Duke of *Medinaceli* were notorious during the second half of the 17th century, centered around bitter arguments about the procedures that governed the tests and determined the soap cost. Regarding this situation, we found an interesting, internal memorandum issued by the Duke of *Medinaceli* to the management of the RAS about insights to be considered during the development of the tests (ADMSA. *Legajo* 55-4).

> "First, we have to find out the cost of the materials in each of the tests[7]. We should calculate and add all the corresponding taxes as well as all costs legitimated by extant documents.
>
> Second, we have to discover the sources of differences between the two tests, that is, whether they correspond to taxes or any other item, and all calculations should be made very clearly and separately.
>
> Third, we have to continually update our accounting books and check if there is anything left.

[7] He refers to the test that used purpose-purchased materials *versus* the one that used the materials from the RAS' inventories.

> Fourth, the whole process has to be monitored to the letter (*a la letra*, in detail). Otherwise, it is impossible to discern the price of the items and the level of consumption."

On December 6th, 1672 the King answered the complaints of the Duke about the non-inclusion of some items in the production cost of soap and ordered the development of a test that "should comprise all costs and rights so that the price reflects them all" (ADMSA. *Legajo* 55-13). However, the local government did not obey this order on grounds of its right to set the soap price and establish the governing procedure of the tests.

On May 19th, 1692, the local government held a plenary session to set the soap price at 28 *maravedíes*. The Duke of *Medinaceli*, however, disagreed with this decision and forwarded a memorandum of complaints to the King (ADMSA. *Legajo* 55-4; AMS. Section 4, Volume 1, Number 16). The memorandum, written in flamboyant style, depicted the errors that took place during the development of the supporting test. He also argued that most of the administration costs were not included in the production cost and provided several examples. Of interest for this paper is the Duke's complaint about the non-consideration of the salary of the priest in the soap cost:

> "[To guarantee the supply of soap to the City of Seville, the RAS] are obliged to operate on Sundays. This forces me to provide a Sunday mass service for foremen and operators because they are naked while running production and cannot leave the premises in such conditions."

Also important, the Duke claimed that the local government dismissed his demands to set "my earnings as a constitutive part of price." In particular, he argued:

> "[The local government] does not admit any earning to me as a purveyor, as it has done in the past, and as it is currently done in the cities of Cádiz and Xerez. Further, it has recognized an additional 8 per cent to prevent the deterioration of the materials and the stored soap. The contention that spreads throughout the City is that if such expense is considered, then there will be no allowance for earnings. This lacks support [because] what is expense is not earnings, and

earnings cannot be denied to the purveyor. Moreover, the privilege will be useless if I cannot profit from it."

GENERAL DISCUSSION

Historical research in management accounting has provided many perceptive insights on the functioning of early cost systems in competitive environments but equally neglected the role of cost accounting in early regulated markets. Importantly, such market conditions dominated many Southern European and Latin-American economies around the end of the Middle Ages and the Renaissance. For example, as far as the City of Seville was concerned, bricks (AMS. Section 3, Volume 13, Number 15), fish (AMS. Section 4, Volume 29, Number 16), and olive oil (AMS. Section 4, Volume 4, Number 15)[8] were just three examples in the long list of goods that operated under stiff market regulation. In this study, we examined the case of the soap production and distribution monopoly in the City of Seville – a monopoly granted by the King of Castille to the Duke of *Alcalá* in 1423, only the pricing decision was left to the local government. We found that the parties (i.e., the Duke of Alcalá and the local government) designed and implemented a complex system of cost calculations that invested them with legitimacy before the King and the public opinion at large. Therefore, the tests and their accompanying cost calculations became a taken-for-granted institution that helped making the monopoly an undebatable terrain and, ultimately, enabled its survival for nearly four centuries. In spite of the objective nature attributed to cost accounting data, the parties engaged in active agency to shape in their favor the constitutive elements of the institution, namely: the use of purpose-purchased *versus* stored materials; consideration of rents that may be earned by the Duke if the factory building were leased; interest of the investment in raw materials and machinery; and salary of personnel (i.e., administrator, slaves, priest).

Discussion from the perspective of institutional sociology

From the standpoint of institutional sociology, our findings suggest several considerations. First, the tests constituted a "mystical" tool (Dirsmith,

1986: 358) that aimed at instilling rationality and visibility in the price-setting decision and, especially, at investing the parties with legitimacy and support (Scott and Meyer, 1991: 124). In spite of discrepancies between the parties about the specifics of the tests, their development provided the RAS with regulatory endorsement from the local government of Seville (Deephouse, 1996: 1025), which we deem as a crucial support for a firm that operated as the sole supplier in a market regulated by the local government.

The pursuit of regulatory and public endorsements was regarded as critical for organizations facing "uncertain or ambiguous purposes" (Covaleski and Dirsmith, 1988: 3). In the case of the RAS, we observed a tension between its external commitment as sole supplier of a public service and its hidden, profit-seeking goal. Whereas the former appealed to the external environment of the RAS and resulted in rounding down the decimals in the cost accounting calculations of the 1525 test to benefit the people of Seville, ADMSA. *Legajo* 51-4; AMS. Section 1, *Litigios*, Folder 116, Number 57), the latter could not be openly claimed by the RAS. We found only one claim that touched upon this notion of private profit, and it occurred at the end of our observation period. In 1692, the RAS claimed: "… what is expense is not earning, …, [and] the privilege will be useless if I [the RAS] cannot profit from it" (ADMSA. *Legajo* 55-4; AMS. Section 4, Volume 1, Number 16). Even at this late date, the Duke admitted a doubtful acceptance of the public opinion towards his profit-seeking goal: "… The contention that spreads the City is that if such expense is considered [provision for the deterioration of inventory] then there will be no allowance for earnings …"

Lack of public endorsement may threaten the survival prospects of organizations operating in regulated markets. Though the environments that witnessed our observation period were far from present day democracies and their monitoring mechanisms of regulated markets (i.e., parliamentary committees, regulatory bodies), the clauses that governed the royal privilege

[8] Regrettably, available archival documents on these regulated items are sparse and not well preserved.

were subject to control and change, as shown in the agreement of January 18th, 1643 (ADMSA. *Legajo* 53-38; AMS. Section 4, Volume 5, Number 15). This agreement established the soap price for the following eight years and stated that prices would be revised in the event of changes in the terms of the monopoly. Such changes, we suggest, had occurred if management of the monopoly had upset powerful constituents like the King and the people of Seville. Interestingly, Sevillians had a long tradition of uprisings against high prices of basic goods or poor standards of living (Morales Padrón, 1977: 106-115; Domínguez Ortíz, 1984). For example, in 1521, the neighborhoods of Omnium Sanctorum lead an uprising of the entire City of Seville in demand of food. The rebels nearly sacked the city council and succeeded in seizing the local prison and free its inmates (Morales Padrón, 1977: 114). Also relevant was the revolt of the Spring of 1652 that protested against the high prices of bread, a regulated good whose price was not the outcome of a test development (AMS. Section 3, Volume 13, Number 14; AMS. Section 1, Folder 112, Number 4). The revolt resulted in the seizure of local prisons and military settlements. In short, we suggest that such a tradition of civil unrest might have appealed to the parties and exerted some influence on the management of the monopoly; for example, by stressing the mystical ritual of the tests and the concomitant imagery of objectivity that was enshrined in cost calculations. We argue that the tests rendered feasible the long-term survival of the monopoly by enabling the public endorsement of the parties by the general public (Deephouse, 1996) and avoiding claims of mismanagement and high prices.

Regulators also sought to enhance their legitimacy before the state, for otherwise their posts might have been at stake. Our data reveals that the tests served legitimating purposes for the local government, which used them to placate some of the demands of the Crown that echoed complaints of the Duke. It is revealing, for example, that the local government drew on the results of an undated test around 1614 to express public disagreement with the royal decision to set a soap price of 24 *maravedíes* / pound, insofar as a recent test determined soap cost to be 15.83 *maravedíes* / pound (AMS. Section 4, Volume 1,

Number 11). In a similar vein, the local government refused to implement the Royal Order of December 6th, 1672, to increase the soap price. It is worth noting that such dismissals of the royal orders occurred in a non-democratic, Ancient Regime context.

The legitimating function of the tests was reinforced by their technical appearance as well as their association with independent professionals (Richardson, 1987; Covaleski and Dirsmith, 1988: 6). The tests were conducted by external experts, supervised by local judges and certified by an independent accountant of the Catholic Church. Importantly, data incorporated into cost calculations were certified by either suppliers of raw materials or by the accounting books of the RAS. The parties supported this technical imagery of accounting calculations. The Duke, for example, relied on a technical discourse to channel his complaints against specific elements of the tests. This was shown by his claim that tests had to use materials taken from the RAS instead of those purpose-purchased, justified on grounds that the former would provide a fair depiction of the regular conditions that witnessed the production process of soap.

Second, our findings reveal that the legitimating effects of the tests outweighed their intended, economic purposes of price setting (Carruthers, 1995). As we have seen, the price setting decision did not necessarily draw upon the outcome of the tests. In the 1525 test, for example, the production cost was 5.125 *maravedíes*, but the price was set at 6 *maravedíes* because of the observed "high performance" of olive oil (ADMSA. *Legajo* 51-4). In 1614, the production cost that resulted from the test was 30 *maravedíes*, though price was set at 24 *maravedíes* because of the "poor quality" of the materials (ADMSA. *Legajo* 53-19). Further, in the second test conducted in 1614, the soap production cost was 15.83 *maravedíes*, but the price was set at 18 *maravedíes* "to deter further delays and lawsuits [from the Duke]" (ADMSA. *Legajo* 53-19). In short, the ritual of the tests and their imagery of objectivity, cost calculations and reliance on independent professionals signaled the rationality of the pricing decision to the main constituents of the parties: the people of Seville and the King (Meyer,

1986; Richardson, 1987), whereas the final price was largely affected by non-technical considerations.

Lastly, our findings concur with predictions of institutional sociologists about the development of active agency by individuals and organizations to create an environment that can enact their claims. The Duke enacted the practice of permanent lobbying before the King to create new legitimating beliefs (Suchman, 1995). His lobbying efforts encompassed issues of tests undertaken with materials taken from the RAS as well as consideration of the items that should be included into the total cost of a pound of soap (i.e., rent that would be obtained in case of renting the buildings that hosted the RAS, ADMSA. *Legajo* 51-4). As noted above, these claims were invested with technical appearance (Scott and Meyer, 1991: 124; Carruthers, 1995), and this occurred even in the demand for incorporating the priest's salary into the production cost of soap (ADMSA. *Legajo* 55-4; AMS. Section 4, Volume 1, Number 16). Interestingly for our purposes is the fact that the latitude exhibited by the Duke to manipulate the terms of the tests was contingent upon his political influence in the Royal House (Oliver, 1991). For example, the King's support for the inclusion of "… *all* costs and rights" (ADMSA. *Legajo* 55-4, emphasis added) in the cost of soap had to wait until 1672, when the powerful Dukedom of Medinaceli took over the RAS management. The political influence of the Dukedom of Medinaceli at that particular time may be signaled by the appointment of the Duke as Spanish prime minister on February 22nd, 1680. Paraphrasing Burchell et al (1980: 17), we contend that cost accounting became a mechanism around which interests were negotiated.

Taken together, our findings indicate that the tests and their accompanying cost calculations played an instrumental role in the survival of the King of Spain's policy of granting monopolies to his warlords as a reward for their achievements. Our findings also suggest that the Duke deployed a variety of simultaneous strategies with the overall purpose of enhancing his financial results (Suchman, 1995). As noted above, the Duke never questioned the institution of the test itself because it arguably legitimated the pricing

decision and ultimately protected the RAS from claims of poor efficiency. In spite of this apparent compliance with tests, the RAS simultaneously deployed a strategy to manipulate the wider environment of the institution by using the political influence of the Duke over the Crown to modify the governing procedures of the tests. In short, this suggests that the Duke clearly engaged in a strategy that distinguished actual from apparent behavior or, as institutional theorists would put it, the RAS enmeshed in a planned activity to decouple (Meyer and Rowan, 1977; Abernethy and Chua, 1996).

Discussion from the perspective of historical research in management accounting.

Our findings rely on the quality of the archival evidence, which consisted of a fairly complete, well-preserved set of documents. Our archival evidence let us address the development of the tests from both the perspectives of each of the parties as well as their correspondence with the King. First, our evidence provides support for the contention that early cost management systems attempted to turn performance into writing and, by doing this, initiated practices where targets and results were produced from the past into the future (Hoskin and Macve, 1994; Ezzamel, 1994, 1997). This is exemplified by the careful account of tests kept by the accountant of the Catholic Church as well as by the concluding reminder of the 1515 test, which stated that performance "was beneficial for the people of Seville and *worth being taken as a reference for the future*" (ADMSA. *Legajo* 51-4; AMS. Section 1, *Litigios,* Folder 116, Number 57; emphasis added). Further, the Agreement of 1643, between the RAS and the local government, drew upon an understanding of past, normal result (ADMSA. *Legajo* 53-38; AMS. Section 4, Volume 4, Number 15), which were incorporated into the control procedures of the RAS to assume a performance of 52 pounds of soap per *arroba* of olive oil.

Second, the parties deployed a complex system of cost calculations that attached values to objects, or as Ezzamel and Hoskin (forthcoming) would put it, accounting was used as a creator of value. Cost calculations were implemented by the RAS, a small-sized firm, which in turn provides support

for Boyns and Edwards' (1997:22) contention: "there is no reason why, *a priori*, one should expect a link between the development of large-scale business and that of management accounting." Admittedly, some cost allocations were quite straightforward. For example, the costs of raw materials were calculated through the aggregation of purchase and transportation costs, plus the corresponding taxes. Other calculations, conversely, involved a deep understanding of production costing. For example, administration and non-production costs were allocated to soap cost as a function of the annual production schedule of the RAS, which in turn required a precise forecasting of soap demand. Further, the RAS argued that present investments in inventories and machinery could otherwise earn a 10% interest rate and thus claimed that this had to be incorporated into the production cost. Similarly, the RAS vindicated that alternative leasing of the buildings that housed the factory would provide the Duke with rents that should equally integrate product cost. Also, as noted above, the parties determined the normal performance of olive oil, which became a crucial element for proper calculation of the soap cost. In short, such calculations depicted the utilization of standards based on expectations from past results some centuries before the advent of scientific management (Fleischman and Tyson, 1998: 93).

Taken together, these findings revealed the development of forms of cost keeping practices that were not double-entry based (Miller and Napier, 1993). They also signaled the expertise of the RAS in ascertaining the constitutive elements of product costing and, ultimately, about the notion of firms' profit. Such understanding was eloquently framed as a pure, technical discourse that attempted to persuade the King and the local government about the elements that should be incorporated into soap production costs (Carruthers, 1995). Interestingly, however, we observed stability in the cost categories as well as in the soap production technology used during our period of study.

Third, a debatable issue in historical management accounting research is the extent to which such data informed managerial decision-making (i.e., Hoskin and Macve, 2000). Regrettably, there is no available 16th and 17th

century evidence for proper comparison purposes. Our findings show that the RAS did not use cost data from the tests for regular managerial decision making, with the exception of the overall understanding that an *arroba* of olive oil should produce 52 pounds of soap, as shown in the 1643 agreement (ADMSA. *Legajo* 53-38; AMS. Section 4, Volume 4, Number 15) and in the 1525 test (ADMSA. *Legajo* 51-4; AMS. Section 1, *Litigios*, Folder 116, Number 57) . On the one hand, such results are similar to those found by Boyns and Edwards (1997a, 1997b), who reported little development of costing information in management decision making in 19th century UK. On the other hand, such results depart from those found by Carmona *et al.* (1997, 2002), who demonstrated the use of cost data in managerial decision making in the Royal Tobacco Factory of Seville, in 18th century Spain. Thus, our results also deviate from those found by Tyson (1998), who reported the use of cost data in business decision making in early 19th century US textile mills.

Third, our findings have shown no traces of incorporating accounting into the disciplinary nexus of management practices (Ezzamel, Hoskin and Macve, 1990), and thus, no shift has been found to extend standards of raw materials to human performance (Hoskin and Macve, 2000). We contend that the absence of cost data on human performance might be attributed to the extensive use of slaves in shop floor operations (ADMSA. *Legajo* 51-4). Lastly, we have observed the use of an ample variety of complex cost accounting techniques during the years of 1525-1615, a time period that has been widely neglected by management accounting historians. These techniques involved issues that, expressed in present-day terminology, comprised standards of raw materials consumption (i.e., olive oil), production capacity (i.e., annual estimation of the RAS turnover), calculation of wastage (i.e., raw materials in the tests), and opportunity costs (i.e., factory building and investment in inventory and machinery). It is insightful that such sophisticated techniques were in use at a time in which it was not possible to handle the decimals.

Extensions

As noted by some commentators (i.e., Hoskin and Macve, 2000; Carmona and Macías, 2001), cost accounting practices mediate the undertakings of public sector agencies as well as the interface between the state and private sectors. Many Southern European and Latin American territories during the 16th-19th centuries exemplified an overriding presence of the state in the economy, and thus, such contexts are also relevant to the study of the circumstances that witnessed the emergence of cost systems. In particular, we think that a promising research area is the historical examination of the state's efforts to stress the imagery of objectivity of cost data to garner public endorsement. Similarly, investigation of the extent to which cost systems mediated the relationship between the state and some powerful constituents (i.e., the knighthood, the Catholic Church) may enhance understanding of the reasons that motivated the deployment and use of cost data in varying settings. Lastly, investigation of cost accounting practices in the price setting decision in present-day, deregulated markets (i.e., US energy) and privatized sectors (i.e., the UK water supply, from 1989) may also highlight the intertwinement between the technical and the discursive natures of management accounting systems.

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Table 1:
The 1525 Test:
Cost of raw materials

Materials	Consumption	Unit cost	Total cost
Olive oil	3 arrobas	140.5 maravedíes	421.5 maravedíes
Ashes	6 fanegas	50 maravedíes	300 maravedíes
Lime	2 ½ fanegas	39 maravedíes	97,5 maravedíes
Wood	1 carga	68 maravedíes	61 maravedíes
Lye	6 cuartillos	2,5 maravedíes	15 maravedíes
Total cost			895 maravedíes

Table 2
The 1525 Test:
Other costs.

Items	Proposal made by the administrator of the RAS	Decision made by the local government of Seville
Repair and maintenance of cauldrons. Purchasing of ropes and related items	12,000	8,000
Preparation of cauldrons for the test	6,000	4,000
Fabrication of sundry materials	10,000	6,000
Taxes for ashes	7,500	7,275
Rent that would be obtained if the building hosting the RAS were leased	16,000	10,000
Wages and food for the lady in charge of the office of weights	6,000	6,000
Food and wages for the six operators of the shop floor	57,000	40,000
Yearly taxes for soap turnover	120,000	40,000
Returns for investments in materials and machinery	300,000	20,000
Salary of the administrator	40,000	30,000
TOTAL		171,275

Table 3
The 1615 Tests:
Cost of Raw Materials.

Raw Materials	Test made with purpose purchased materials			Test made with materials taken from the RAS		
	Consumption	**Unit Cost**	**Total Cost**	**Consumption**	**Unit Cost**	**Total Cost**
Lime	2 *fanegas*	133.166 *maravedíes*	266.33 *maravedíes*	2 *fanegas*	72.9166 *maravedíes*	145.833 *maravedíes*
Ashes	3.5 *fanegas*	255 *maravedíes*	892.5 *maravedíes*	3.5 *fanegas*	187 *maravedíes*	654.5 *maravedíes*
Wood	7 *arrobas* and 8 *pounds*	98.25 *maravedíes*	163.33 *maravedíes*	3 *arrobas* and 2 *pounds*	89.25 *maravedíes*	68.7225 *maravedíes*
Olive Greaves	0.5 *fanegas*	136 *maravedíes*	68 *maravedíes*	1.5 *almud*	136 *maravedíes*	17 *maravedíes*
Olive oil	1 *arroba*	375.083333 *maravedíes*	375.083333 *maravedíes*	0.78125 *arrobas*	386.25 *maravedíes*	301.75 *maravedíes*
Lye	---	---	---	0.140625 *arrobas*	40 *maravedíes*	5. 625*maravedíes*
TOTAL			1,765.25 *maravedíes*			1,193.43 *maravedíes*

APPENDIX

Measures to weight merchandise:

Quintal	*Arroba*	Pound	*Cuartillo*
1	4	100	128
	1	25	32
		1	1.28
			1

Monetary (i.e., *real, blanca, nueva*) and account units (i.e., *ducado, maravedî*):

Ducado	*Real*	*Maravedí*	*Blanca*	*Nueva*
1	11	375	748	1,496
	1	34	68	136
		1	2	4
			1	2
				1

Measures to weight liquids, crops and rough materials (i.e., wood):

Carretada = Carga	*Fanega*	*Almud*
1	8	96
	1	12
		1